auscultation, coughing before inspiration is a valuable aid in eliciting rales.

5. A single negative sputum examination is not conclusive. Several negative sputum examinations should not outweigh results obtained by other methods.

6. A positive tuberculin test means that tubercle formation has been present in the person reacting to the test but does not necessarily indicate the need of treatment.

7. A diagnosis in early tuberculosis must be made only after a careful weighing of the patient's history, his symptoms, his physical signs, the examination of his sputum, and his reaction to tuberculin. It is here that judgment and experience find their highest expression.

THE OCCURRENCE OF HEART BLOCK IN ACUTE DISEASES.*

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In the last ten years the number of reported cases of heart block has reached very considerable proportions, due largely to the interest taken in the subject following the successful experimental production of the condition, and to the more general use of graphic methods in the study of cardiac diseases. The great majority of the reported cases are instances of the chronic variety, as usually met with in adult life. That heart block may occur as a transient or even permanent feature of acute disease at any age is not, I think, very generally understood, nor is the importance of its recognition fully appreciated. One finds here and there casual reference to the fact of its occurrence, and some of the special works on heart disease make particular mention of it, but in looking over the literature on cardiac disease for the past seven years I could find only three articles dealing more or less directly with the subject, aside from individual case reports. Peabody in 1910 reports a case and reviews the literature to that date. Cowan in 1912 gives his experience, embracing a number of cases; and Lewis in 1913 in a lecture emphasizes particularly the importance of the recognition of this condition. Mackenzie in his numerous writings occasionally makes mention of it.

Before giving my results of a review of the literature, it may be well to define just what is meant by heart block. Lewis defines it as an abnormal heart mechanism in which there is a delay in, or absence of, response of the ventricle to auricular impulses, and this conception of the condition is the usually accepted one. Normally the ventricle contracts in response to an impulse received from the auricle, the stimulus traveling from the upper to lower chamber along the neuromuscular tract known as the auriculoventricular bundle. The time for the passage of this impulse varies within fairly narrow limits, 0.12 to 0.18 of a second, and does not in health exceed 0.2 of a second. The mildest grades of heart block consist in a mere prolongation of this conduction time; more severe grades in the occasional failure of the ventricle to respond to the auricle; then the ventricle may contract only after every second, third or fourth auricular contraction; finally, complete dissociation occurs and each chamber beats independently and at its own intrinsic rate. The milder grades of heart block cannot be recognized without the aid of graphic methods; complete block, owing to the slow ventricular rate usually present, does not necessarily require tracings for its detection.

In order to obtain some idea of the frequency of occurrence of heart block in acute diseases, I have examined all the references available to me and have found mention of sixty-one cases. That number does not, I think, give a fair idea of the frequency of the condition, partly owing to the transient nature of many cases and partly to the failure of many physicians to attempt to differentiate the several kinds of cardiac arrhythmia. In the interests of prognosis and of treatment, such a differentiation is however decidedly important. Peabody, in his article published in 1910, found only eleven cases in the literature where there was good proof of the presence of heart block in association with acute infection; evidently the cases are now being recognized more frequently.

These sixty-one cases have occurred as manifestations of a variety of acute conditions. As might have been expected the rheumatic group of infections includes by far the largest number of cases; eighteen in association with acute articular rheumatism, two with pericarditis and one with tonsillitis. In possibly five of these the block was thought to be complete; all of the others were instances of partial block and of transient duration.

Diphtheria comes next on the list, accounting for nine cases. Five of these were fatal, though just how much influence the heart block had on the fatal outcome is problematical. That block is of infrequent occurrence in diphtheria is indicated by two recent studies of the heart in this disease. Gunson investigated 120 cases, making numerous polygraphic studies. He does not report any instance of block. Hume and Clegg, in a study of 573 cases, found one with block. Three were thought to have auricular fibrillation and heart block, but in the absence of electrocardiographic study there is naturally some doubt of this.

Acute endocarditis accounts for four cases, all of which were fatal. In two the block was complete; in two incomplete. Two cases of chronic valvular disease with transient reinfection showed partial block during this stage. It is strange that not more instances of this character are reported, for several writers, particularly Lewis and Mackenzie, have called attention to the frequency of its occurrence.

In association with pneumonia six cases are reported, all of partial block of transient nature.

Pyogenic infection of one sort or another accounts for seven cases. One of these was in association with general gonococcic septicemia and three with local gonococcic infection. Complete block developed in the course of an infected mastoid wound. One case had only cystitis for an etiological factor, while sepsis following trauma

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accounted for one. This last was rather interesting. A man shot himself with suicidal intent apparently directly through the heart, for subsequent X-ray examination showed the bullet in the retrocardiac space near the vertebrae and next to the right auricle. It moved with each heart beat but lay outside the heart wall. Three weeks after the shooting the man developed severe pericarditis and pleuritis following infection of the wound. Pulse was 70 to 80. Recovery ensued. One year later he was examined and found to have a pulse of 40 and tracings showed complete block.

In association with typhoid fever three cases are reported, all of transient nature. Erysipelas, influenza and scarlet fever each account for one case, all of mild and temporary character.

Complete block developed in one instance during a six months' illness from tuberculous peritonitis. No other etiological factor could be found and it was known that for two years previous to the illness the pulse had been of normal frequency.

One case is attributed to acute gout and one to an illness which was called gastro-enteritis. Complete block developed after severe hemorrhage in one patient. This was of only a couple of days' duration; subsequently the conduction time was normal.

There was one case of partial block which came on seven days after an operation for exophthalmic goitre. Recovery ensued after one week. Finally, one case in which tracings are said to have shown complete block developed after an alleged fall on the head. There was high fever for several days and the exact etiological factor is in doubt.

A certain objection can be urged against the acceptance of all of these reported cases as instances of heart block, for in some where tracings are said to have been made they are not published, while in quite a number no graphic records were obtained, the diagnosis resting on the occurrence of marked brachycardia with frequent visible jugular pulsations and sometimes syncopal or epileptiform attacks. However, with the great majority there is but little doubt of the correctness of the diagnosis.

In analyzing these cases several facts of interest are brought out. In general the condition was a decidedly mild one; in some the block was complete and permanent; in the majority it was incomplete and transient. It may be noted only during a single day of the illness or over a considerable period and well into convalescence. In a great many instances it is unattended by any subjective manifestations, but in quite a number definite symptoms of Adams-Stokes syndrome occurred: giddiness, transient loss of consciousness or epileptiform convulsions. As for the age incidence, the condition may occur at any age but in contradistinction to chronic heart block, which is more commonly seen in elderly people, the acute cases are more frequently met with in the young. A number were in children under ten years; the youngest in a child of three. One striking feature is the completeness with which all trace of the block may disappear. For example, Gosse reports the case of a boy of twelve who had mitral and aortic insufficiency and who had previously suffered from pericarditis and rheumatism. He ran an irregular fever for four weeks, for a time there was only a prolongation of the a-c interval; later partial block developed and persisted for eighteen days; this then disappeared and finally the a-c interval returned to normal. The condition was verified by polygraphic and electrocardiographic records. There are a number of such examples in the rheumatic group of cases.

Among the sixty-one cases death is definitely stated to have occurred in twelve; in some the outcome is not mentioned. Four of these were cases of acute endocarditis which is so often fatal; five were instances of diphtheria in which the death rate is also fairly high. In several cases careful examination of the heart has been made, including serial sections of the auriculoventricular node and bundle, and we are in consequence in possession of data throwing some light on the nature of the process that is directly responsible for the heart block. One of the most carefully studied cases is reported by Butterfield. A girl of sixteen was ill for seven weeks with acute endo and pericarditis. Partial block developed eleven days before death. Microscopical examination of the heart showed perivascular inflammatory lesions in the myocardium, diffusely scattered but conspicuous in the region of the central fibrous body where they had invaded the auriculoventricular bundle. Fleming and Kennedy made a careful microscopical study of the heart of a girl of ten who died on the tenth day of a diphtheria and who developed a complete block before death. There was found an interstitial myocarditis; infiltration with inflammatory cells, mostly lymphocytes, as well as focal collections of these cells. Similar changes occurred in the auriculoventricular node and the first part of the bundle.

One of Gerhardt's cases is of interest in that the acute heart block was recovered from and the patient died later of another cause. A man of twenty-five was sick for several months with angina and rheumatism complicated with pericarditis and pleuritis. Early in the disease his heart was irregular and tracings showed a varying grade of block, probably at one time complete. There were several attacks of anxiety and loss of consciousness during which his pulse became very slow. Recovery finally ensued. When about ready to leave the hospital the patient contracted typhoid fever and died in the fifth week from hemorrhage. Examination of the auriculoventricular bundle by means of serial sections showed areas of decided cellular infiltration, particularly marked in the neighborhood of the vessels. Also there was a marked change in the vessels themselves: decided thickening of the intima so that in many of the larger vessels the lumen was decidedly narrowed, slight changes in the media and some cellular infiltration in the adventitia.

We have positive evidence then that in many cases at least of acute heart block we are dealing with a condition dependent on an organic basis. Whether or not all cases can be thus explained is not yet definitely settled. Lewis, whose opinion

carries great weight, feels that they can. Others differ with him and would explain some of the cases as due to increased vagus tone. In support of this contention is the occasional relief of the block by the use of atropin and also the well known fact that vagal stimulation is capable under some conditions of causing heart block. Probably though this does not occur unless the auriculoventricular node and bundle are already damaged by disease. The weight of evidence is certainly in favor of an organic basis for all cases.

The real importance of the recognition of these cases of acute heart block lies in the fact that through them we have definite evidence of the involvement of the myocardium in the disease process and in many instances this is the only evidence that the infection has spread beyond its original confines and has invaded the heart. The involvement of the auriculoventricular node and bundle is of course only part of the general myocardial invasion; through knowledge of its specialized function we are able to recognize disturbances in it.

In place of involvement of the auriculoventricular node or bundle we may have damage to one or other branch of the bundle. This alone does not cause any irregularity of the pulse and without the aid of the electrocardiograph cannot be detected. The only physical sign that may accompany it is a decided reduplication of the first heart sound. Disease of one bundle branch is usually a chronic process but it may occur as a manifestation of acute infection, and when it can be recognized it has the same significance as true block.

In conclusion one may say that heart block occurs not infrequently as a manifestation of acute infectious disease. Probably a good many cases are unrecognized because of their very mild and transient nature. In many cases the disturbance has been proven to depend on definite organic changes; probably the majority if not all cases are to be explained on a similar basis. Partial heart block may be the sole manifestation of involvement of the heart in the acute infection.

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PITFALLS IN THE DIAGNOSIS OF RENAL LITHIASIS.*

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In spite of the great strides made in the correct preoperative recognition of surgical renal lesions, and in spite of the many exact methods of examination by which renal surgery of late has advanced to an almost marvelous degree, the diagnosis of surgical kidney lesions is, nevertheless, in many instances very difficult and, not rarely, entirely impossible. The application of the majority or even of all of the many exact methods of examination at our disposal to-day does not always give reliable results of truly pathognostic value. The hidden position of the kidney renders palpation difficult and may, on account of the manifold relations of the kidney to important neighboring organs, render it a procedure of doubtful and misleading diagnostic character. Chemical urinalysis, so valuable in internal medicine, is of no material aid in the majority of surgical renal lesions. Cystoscopy and radiography will at times fail to give exact data, and especially the latter method may occasionally lead to erroneous conclusions; determination of renal function, moreover, by many renal surgeons heralded as unimpeachable evidence in renal diagnosis, is almost valueless in the absence of a marked relative functional discrepancy, and even the most modern diagnostic method, pyelography may, in many instances, fail to furnish a clew to the correct diagnosis.

These remarks are not written in a pessimistic attitude of mind, inclining towards minimizing the value and efficacy of our modern armamentarium in renal diagnosis; for the old adage, *"qui bene diagnoscitur, bene curabit,"* is nowhere in the realm of medical science more appropriately applicable than to renal surgery. The many noteworthy observations on clinical renal lesions, which are recorded in the literature since the first kidney was removed by Gustav Simon, have obtained their real and intrinsic scientific value on the basis of a thorough knowledge of modern diagnostic methods, and the preoperative diagnosis of renal lesions, therefore, stands to-day on a much firmer scientific basis than formerly. Thus it occurs that the diagnostic exposure of the kidney, which up to a short time ago was practiced by many surgeons as a procedure of choice, is to-day a method of last resort which is considered permissible in exceptional cases only.

The diagnosis of nephrolithiasis seems at present a simple procedure on the basis of the evidence furnished by radiography and is undoubtedly easily

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